DATA PROCESSING DIGEST

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General Information

SOME LEGAL ASPECTS OF COMPUTER USE IN BUSINESS AND INDUSTRY

Roy N. Freed, Ballard, Spahr, Andrews and Ingersoll, Philadelphia, Pa.
THE JOURNAL OF INDUSTRIAL ENGINEERING, July-August 1961; pages 289-291

HOW COMPUTER SPECIALISTS CAN HELP LAWYERS

Roy N. Freed
THE JOURNAL OF INDUSTRIAL ENGINEERING, September-October, 1961; pages 324-327

The law affects the work of computer manufacturers through the negligence law which tells who shall bear the loss in each case where injury to persons or property results from an accidental mishap or error. For example, there might be situations where the user of the system would accept design compromises and risks of inconvenience in his own operations to avoid greater design costs, but will be unwilling to expose himself to lawsuits and their expense when told of the danger. Thus, the computer manufacturer needs to be able to spot those situations in advance so that the customer can make an intelligent decision on which action to take.

There may also be cases where the use of an EDP system will help a company reduce its exposure to lawsuits; for example, mechanisms with the ability to spot and even correct, accident-producing hazards which might otherwise drag the guilty company into court.

Two types of negligence situations may be identified: 1) an operation using an EDP device fails by accident and hurts people or their property, 2) an activity not using an EDP device causes a harm-producing accident that might have been prevented by the use of that means.

There may be situations in which the avoidance of legal liability requires a higher standard of system or machine performance than otherwise would be sought. This might involve either the incorporation of additional control factors in the specifications of an EDP system being used or contemplated or the adoption of such a system in place of manual or other inferior means for hazard detection or avoidance. An alternative choice can be made only after consideration of each specific instance of possible risk.

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Juries decide negligence cases subjectively

Negligence cases are usually decided by juries of laymen guided by their own experience, since negligence law is the result of human experience rather than legislation. Thus, evidence presented in such a case involving EDP, may be interpreted by jury members on the basis of their own prejudice for or against computers. EDP technology has a number of special aspects which bear on negligence cases. First, the program might be a vulnerable spot if it is not continually reviewed. Second, where EDP devices are used to warn of or prevent hazards, failure to replace obsolete devices by new and more efficient devices might become cause for a negligence suit. Often, engineers will be the first persons to detect the potential for accidents. They should recognize that the legal test of liability for damage is extremely subjective, and is equally fluid because of the rapidly evolving technology. They will benefit from competent legal advice.

Computer specialists can be of service to lawyers in several ways: 1) they can work behind the scenes as consultants, either on preventive projects to avoid legal entanglements or in connection with actual litigation in court; 2) they can serve as expert witnesses in court.

For example, a lawyer may need help in identifying the facts tending to show whether or not his client was negligent; he may need help in getting possession of evidence; he may put the specialist on the stand.

The computer specialist can help by pointing out the fundamental simplicity of computer technology and its complete lack of ability to innovate, being completely dependent upon the program. If the lawyer wishes to capitalize on any awe in which computers are held by judge or jury he should do so as a strategist, with full awareness of reality. Lawyers will need help in assembling relevant technical facts in accident-type cases.

A computer specialist can help the lawyer

A computer specialist can help the lawyer in discovery by suggesting material to request (machine program, records created by a computer hazard device, company records reflecting experience with a computer control system, written reports of the consideration given to the adoption of a computer, and business records maintained on a computer); describing material sought (punched tape or cards, magnetic tape, print-outs) and point out the difficulty of obtaining this from the opponent and the inconvenience it may cause him; using the material secured (interpreting data, evaluating its value and reliability, advising on storage of media); and instructing on testing the adequacy of compliance by the opposing party with the discovery step.

The computer specialist can also suggest types of questions to ask witnesses, and point out any possible deficiencies in the case which might cause embarrassment. The specialist can help in selection of the jury by helping the lawyer become aware of prevailing attitudes.

A specialist used as a witness in court may describe precautions taken in a computer control mechanism or, for the plaintiff, tell

about the availability of hazard detectors which might have been used. In a situation where the jurors appear to be antagonistic, the specialist might be used to help them understand the technology.

To be most effective, the specialist should have a general familiarity with legal rules and procedures and will have to take the initiative, when consulting with lawyers, to compensate for the inability of lawyers to appreciate the technical aspects adequately. However, the specialist should be guided by the lawyer's instructions, which will reflect the requirements of the situation.

((Other articles on EDP and the legal profession are: "Try Suing a Computer!" in THE MANAGEMENT REVIEW, August 1961; "Prepare Now for Machine-Assisted Legal Research," in AMERICAN BAR ASSOCIATION JOURNAL, August 1961 (both by Roy N. Freed); and "Law Practice 1971," by John C. Satterfield, President of the American Bar Association, in THE LEGAL INTELLIGENCER, August 29, 1961.))

MANAGEMENT INFORMATION CRISIS

D. Ronald Daniel, McKinsey & Co., Inc.
HARVARD BUSINESS REVIEW, September-October 1961; pages 111-121

The gap between a static information system and a changing organization results in inadequate management information. Organization structure and information requirements are "inextricably linked." Information includes all the data and intelligence that are needed to plan, operate, and control a particular enterprise. This includes external information such as economic and political factors and data on competitive activity. In most companies "it is virtually taken for granted that the information necessary for performance of a manager's duties flows naturally to the job."

Informal information systems don't work in large companies

An informal system can work well for small and medium-size companies in simple and relatively static industries, but "it becomes inadequate when companies grow larger and especially when they spread over several industries, areas, and countries.... Companies very seldom follow up on reorganization with penetrating reappraisals of their information systems, and managers given new responsibilities and decision-making authority often do not receive all the information they require."

The determination of each executive's information needs requires a clear grasp of the individual's role in the organization. "The task is then to: design a network of procedures that will process raw data in such a way as to generate the information required for management use; and implement such procedures in actual practice."

Three types of information are needed

Development of a dynamic and usable system of management information must go beyond the limits of classical accounting reports. Information must be conceived of as it relates to two vital elements of the management process-planning and control. Planning means setting objectives, formulating strategy, and deciding among alternative investments or courses of action. Planning information is of three types: 1) environmental (which describes the social, political, and economic aspects of the climate in which the business operates); 2) competitive (which explains the past performance, programs, and plans of competing companies); 3) internal (which indicates the company's own strengths and weaknesses).

Environmental information includes data on population, price levels, transportation, foreign trade, and labor. A company operating internationally would add the "systematic collection and interpretation, on a country-by-country basis, of information on political and economic conditions in the foreign areas where business is being done. Environmental data must indicate trends in all these areas. Some kinds of information are not available and must be pieced together from various sources or acquired by devious means.

Three types of competitive data are important: past performance, present activity, and future plans. There is seldom a concerted effort to collect this kind of material, process it and report it to management regularly.

Internal information, aimed at identifying a company's strengths and weaknesses, includes: quantitative-financial (sales, costs, and cost behavior relative to volume changes); quantitative-physical (share of market, productivity, delivery performance, and manpower resources); and nonquantitative (community standing and labor relations).

Concentrate on "success factors"

A company's information system must be selective, focusing on "success factors" of which there are usually three to six, depending on the type of company. Examples are given of success factors in the auto industry, food processing, and life insurance. Accounting reports rarely focus on success factors that are non-financial, since most accounting is performed, not for facilitating planning, but "to ensure fulfillment of management's responsibility to the stockholders, the government, and other groups."

Planning information needs to be gathered continuously, not in occasional "special studies." New tools are available for information gathering and processing -- electronic data processing systems, communications networks, and the formulation of rigorous mathematical solutions to business problems. Less obvious is the development of new organizational approaches in which the responsibility for management information systems is tied to specific executive positions. Several corporations have attacked this problem by creating full-time management information departments responsible for: 1) identifying the information needs for all levels of management for both planning and control purposes; 2) developing the necessary systems to fulfill

these information needs; 3) operating the data-processing equipment necessary to generate the information which is required.

"To some extent these departments, reporting high in the corporate structure, have impinged on responsibilities traditionally assigned to the accounting organization....But... this overlapping is inevitable, particularly in companies where the financial function operates under a narrow perspective and a preoccupation with accountancy. The age of the information specialist is nearing...."

THE DEVELOPMENT OF AUDITING STANDARDS AND TECHNIQUES FOR EDP SYSTEMS

Richard S. Woods, University of Pennsylvania
N.A.A. BULLETIN, September 1961; pages 27-28

Two major areas of auditing have been affected by electronics: 1) paper evidence, or the "audit trail"; and 2) internal control. It appears that the more efficient the electronic data processing system, the less adequate will be the audit trail. Some proposals have been made to make sure of the existence of traceability: 1) all transactions can be printed out during the processing; 2) in a random access system, a page number instead of date and serial number can be used; 3) source information can be obtained on a selective basis and posted to the balances as of the last prior statements; 4) ledger accounts themselves will continue to be provided in detail. An example is given, showing the audit trail in the computer system of the Fidelity-Philadelphia Trust Company.

The audit trail vanishes

Internal control problems have been pointed out as being: 1) unintentional loss of data; 2) possibility of operator intervention in data processing; 3) reduction in the number of persons processing a given transaction; 4) machine error; 5) conversion of cards to tape. However, more recently, important control points are defined as controls over input, machine controls, programming controls, and controls over output. It is generally agreed that controls currently recommended for document processing in manual systems are adequate but that the premium for keeping such controls tight is much higher in the case of electronic data processing than is the case in manual systems. The absence of any documentation at all no longer seems to be an issue. However, the documentation of external transactions will continue because of the needs of customers and creditors; documentation of internal transactions will continue because of the needs of employees. Controls should be: 1) registration at point of document entry; 2) sequential numbering with full accountability at point of document origin; 3) grouping or "batching" with predetermined document counts, or other control totals.

Controls over data received by wire transmission involve loss of data. It is suggested that each batch of cards transmitted by transceiver be accompanied by a control card indicating the totals of the batch.

Controls may be built into programs and should be provided for in the detailed flow charts that precede coding. A programmed control known as the "internal control log" is a device to assure agreement among the totals of separate runs which utilize the same input data. Check points in long programs (not more than 15 minutes of running time apart) would make certain tests in memory to see if the contents are what they should be; if not, the program returns to the last preceding check point and reprocesses the data.

Control over console operation

An internal control problem is the possibility of console intervention. Three controls are suggested: 1) accounting for processing time; 2) review of the supervisory control typewriter print-out; 3) rotation of duties among operators, change of shift, and similar techniques. The processing of data should be separated from the handling of assets, and the processing itself should be arranged so that a transaction is processed by persons other than those who control the transaction. A third group should be those who plan the processing, i.e., the systems men.

More error data may be expected in electronic systems since the system is more effective at detecting errors than are humans. When error data is discovered, it must be corrected and entered into the next machine cycle.

Auditors must be able to assist their clients to design efficient internal controls in their electronic systems. The auditor could write programs which could be run on the client's computer to validate the records in a much more comprehensive manner than was formerly possible. Two such methods have been suggested: 1) add a loop of instructions to the client's program, a system which does not require a separate run for the auditor's sake; 2) separate programs written by the auditor.

Special training for the auditor

Some feel the auditor needs a special kind of training program, perhaps including: introduction to basic equipment, review of the characteristics and use of each item in a digital computer system, external coding-data representation, internal information structure and codes, including binary representation, internal and external storage, analysis of the problem of adapting the company's data-processing requirements to the system, documentation of data and flow charting of the system, basic concepts of programing, review of peripheral equipment, review of computer logic and logical units, methods of handling and correcting errors, problems of internal control. Training should not be for the sake of increasing the number of people qualified to operate EDP systems but for the sake of increasing the number of auditors qualified to pass upon the output of such systems.

The use of models in auditing is suggested for greater efficiency. In this method, the auditor would construct a model of what the business should have accomplished during the period under review and then measure the known results against this model.

IMPACT OF AUTOMATION ON FINANCIAL MANAGEMENT ACCOUNTING

Lowell D. Farmer, Air Training Command
THE ARMED FORCES COMPTROLLER, September 1961; pages 6-10

In addition to the functional organization of a business entity, there exists a data organization which is far more complex in its interrelationship. Management functions are data sources and consumers, and the data processing function should be a separate organization so that data processing may be coordinated among the management data users. Maximum operation and economy can be achieved only by automating the total system, beginning with the creation of input as a by-product of preparing other documents.

In an organization spread over a wide geographical area, the data processing center concept will yield the greatest capacity and economy, if the data load at one location is not sufficient to pay for a computer installation. These may be connected by a communications network. However, centralized management and centralized data processing are two different things. The data from the decentralized locations may be custom-processed for the locations' needs and then sent back to the locations for local management use.

The accountant's job will be important in the development and installation of the system. He must define and identify management reports, suggest the outputs required, and analyze the resulting reports, interpreting them into lines of action for management.

ERMA COMES OF AGE

BUSINESS AUTOMATION, September 1961; pages 21-25

Matriarch of banking EDP

The Bank of America first proposed an automated banking system in 1949, and when no computer manufacturer became interested in working on the bank's problems, turned to Stanford Research Institute for the development of a prototype electronic check accounting system. The requirements were: 1) to capture information at the source and to deal with it as few times as possible; 2) to have the account number printed on the check; 3) as a by-product of a single initial handling, to be able to post-print the amount; 4) to conform to other banking operations and to the customers' previous banking habits; 5) to handle conventional checks of random size and thickness.

When the common language recommendations of the American Banking Association resulted in MICR, the Bank of America system could be ahead with a practical and economical way of entering checks into the system. MICR was chosen over other methods because of the problems of light source and of differentiating between black and white on checks subject to mutilation or obliteration by endorsement, stamps or smudges, and because of the economy of the method.

In 1956 the Bank of America contracted with General Electric for 30 ERMA systems. While these were being built, the bank developed a data processing staff, and chose the sites and design of ERMA centers. Data processing center sites were chosen on the basis of: 1) frequency and duration of power failures in the area; 2) locations between the farthest branch and a key center; 3) locations relatively safe from primary wartime target areas; 4) sites reasonably close to existing or proposed freeways; 5) cost (for a functional operation, there was no need to pay for prime land). The planning included provisions against fire through maintenance of files at three different locations.

ERMA is a general purpose system

ERMA has become a general-purpose system which will take on additional applications. One of these is the processing of 18 million Traveller's Cheques a year. Next job will be savings deposit accounting. In addition to the ERMA system, the bank has two 7070's located at the centers in Los Angeles and San Francisco. Between them they handle more than 1.5 million real estate and installment loan accounts. Other applications include accounting for branch clearings, bond investment, branch activity, systematic investments cost allocation. A recently developed translator allows communication between the two types of systems. The translator unit is connected on-line to a 1410, and automatically reads or writes ERMA mode information and consolidates data from ERMA and 7070 files.

The computers are controlled through the Computer Systems Research group, which develops new applications and establishes the program standards and controls. This group reports to the vice president, Systems and Equipment Research.

AUTOMATION AND TRAINING OF PERSONNEL

Wilfred C. Andrews, Jr., Bank of California N.A., San Francisco, Calif.
UNITED STATES INVESTOR, August 28, 1961; pages 5-7

Banks will approach automation in various ways, depending upon their size. One of the problems common to all banks, however, is the training of personnel. This would fall into three groups: 1) training of people to program and operate the equipment to be used; 2) retraining those people who are likely to be displaced; 3) training of, or at least informing all other bank personnel regarding the progress of the bank's automation program. This particular bank found it had numerous volunteers among its personnel to work on the computer project. Some of those selected for training did not do well or decided they did not want to continue. However, some of those who did not work out as programers became good machine operators.

The most important phase of training was the retraining of those whose jobs would be eliminated. Fortunately, most of these were jobs in which the turnover was the greatest, and natural

attrition took care of surpluses over a period of time. This was also the time the bank could weed out less competent help. The employee publication was used to keep all employees fully informed about the progress of the program. Stories on the MICR process helped employees to explain the program to their friends, and thus assist in the public education program. In addition, those bank employees who dealt with the public directly, were given special training so that they could answer customers' inquiries or direct them to persons who could answer them.

All department managers, branch managers, and branch operating personnel directly affected by the computer installation needed intensive training. They not only needed to know how the program would affect their day-to-day operations, but also, how it would affect their personnel.

COMPUTER-AGE CONTROL OF OFFICE COSTS

A. F. Everman, Ebasco Services Inc., New York
THE CONTROLLER, September 1961; pages 436-438, 466-468

Some reasons for the increase of white collar workers are the gain in production efficiency brought about by more control and coordinating activities in the office, as well as the growth in service industries.

Some standard methods for controlling office costs are given, including work simplification, scheduling, and mechanization. The idea of the total systems concept is mentioned briefly.

NEED FOR FIRE STANDARD FOR COMPUTER AREAS

DATA PROCESSING (U.S.), September 1961; pages 46, 47

Besides the well-known fire at the Pentagon in 1959, other computer center fires of varying degrees of severity have led the National Fire Protection Association to form a Committee on Electronic Computer Systems to devise a comprehensive code as a national standard for computer area fire safety. A permanent standard will be presented at the NFPA meeting in Philadelphia in May 1962. The Committee asks that any persons having ideas, criticisms and suggestions for the standards write to Chairman, John J. Ahern, 13-205 General Motors Building, Detroit 2, Michigan.

THE CLASS SYSTEM AT SDC

John F. Cogswell and Don D. Bushnell, System Development Corp., Santa Monica, Calif.
AID (AUTO-INSTRUCTIONAL DEVICES), September 1961; pages 43-45

CLASS is a new laboratory at System Development Corporation for the study of automation in educational systems. It will use the Philco 2000 to control group and individual auto-instructional devices and to process educational data for school administrators, counselors, and instructors. Instruction will be given simultaneously in two different subject matters and in two modes of automated instruction -- the group and the individual modes. A high speed printer under computer control will make available information on the state of academic progress of each student, as well as other data useful for management purposes. Reports for scheduling and curriculum planning, budgeting and accounting, can be prepared when the computer is not selecting and analyzing instructional programs.

The teacher may monitor each student

An observation area includes monitoring equipment so that records may be made of the behavior of students and teachers in the experimental environment. In the individual mode of instruction, each student has an electronic component, including a film viewer. The response device is connected through a buffer system to the computer. The trainee begins his lesson with a sequence of educational items or frames presented by means of the film viewer, manually operated by the student. He responds to the questions presented on the viewer by pressing keys on the response device. The computer analyzes the response, gives the student the result of his answer, and if the student is falling below a certain level of achievement, branches his program to a special remedial series. The student can review what he has learned at any time at his discretion. If he needs extensive remedial work, as analyzed by his cumulative record in the computer, an auxiliary program can be read in from magnetic tape.

The teacher in CLASS has four sources of information available for monitoring student learning behavior: a) a teacher's display console, b) a film viewer for monitoring the educational program, c) a response device similar to the student's unit, and d) a digital display monitor. When an instructor initiates a period of automated individual instruction, he inserts the student assignment from punched cards and presses one of the "action" buttons. This brings a Student History Tape into the computer memory, showing where the student is in his lessons, his IQ, and previous grade record. Another magnetic tape will then be read into the computer, presenting the day's lessons to each student.

A student may signal the teacher when he is having difficulty, and the teacher can call up the student's performance from computer memory to help evaluate his difficulty.

In the group mode of instruction, the TV screen and speaker are the common group output, with remotely-controlled slide and film projectors called for by the teacher as needed. Questions asked by the teacher are individually answered by the students on their response sets, allowing the teacher to evaluate each student's degree of comprehension.

THE ABC'S OF EDP

Robert H. Long, NABAC Research Institute, Chicago, Ill.
AUDITGRAM, September 1961; pages 12-21

Anyone who has been on the fringes of EDP and doesn't understand "computerese" will find this article helpful. It defines most of the common terms in electronic data processing and gives a brief history of computing machines.

IBM: SELECTING THE RIGHT DATA FOR PEOPLE WHO NEED IT

PUBLISHERS' WEEKLY, August 7, 1961; page 64

IBM has been experimenting in its own organization with a method of using an EDP system to direct all forms of printed matter to the people in the organization who need the material. The system is called Selective Dissemination of Information. The organization using the system first prepares "profiles" of the people who want to use the system. This profile would be a list of key words chosen by the individual to describe his work interests. As documents or reports are received, profiles are prepared for them. The computer matches the profile of the documents against the profiles of the people. When it finds a match, it produces a notification card which is sent to the person along with an abstract of the document. If the recipient wants a copy of the document, he punches a pre-scored hole in the card and returns it. In addition, he records any changes or additions to the kinds of information he wishes to receive.

Systems Design

THE ROLE OF DATA INPUT IN AUTOMATIC DATA PROCESSING SYSTEMS

Solomon L. Pollack, The Rand Corporation, Santa Monica, California
JOURNAL OF MACHINE ACCOUNTING, September 1961; pages 24-28

Data input problems must be considered at the time the electronic data processing system is designed. Information that management wants must be a focal point in the development of the system, but this information must be carefully evaluated. Sometimes managers interpret "management by exception" to mean that only that data which is clearly needed should be collected. However, experience may show that some information may be needed in the future and should be collected even if not being used at the present. To minimize the chance of different interpretations of data by different levels of personnel, the company should train data input specialists in the company's specific needs.

Cost and design factors in the data input system are important. Cost factors include: 1) the equipment cost; 2) EDP equipment differential applied to data input; 3) dollar value for improved management systems; 4) the cost of detecting and correcting errors; 5) personnel costs. In the design area, consideration must be given to the gain or loss the data input equipment will cause in the usage of the EDP equipment. Also, when a data input system improves the management system, it must be credited with a certain dollar value, generally estimated by the managers. In designing the data input system, the systems designers should specify data checks, to keep down the cost of error detection in other parts of the system. If this is not possible, the cost of error detection must be added to the remainder of the system.

SYSTEMS: RESEARCH AND DESIGN

Edited by Donal P. Eckman, Case Institute of Technology
John Wiley & Sons, 1961. $8.50.

The Proceedings of the First Systems Symposium at Case Institute of Technology are contained in this book. Top names in the systems and O.R. fields are represented. Some of the papers are: "Systems, Organizations, and Interdisciplinary Research," by R.L. Ackoff; "The Use of Operations Research in the Study of Very Large Systems," by E.A. Johnson; "A Problem in the Design of Large-Scale Digital Computer Systems," by R.J. Nelson; "Reliability as a Parameter in the Systems Concept," by S.W. Herwald; and ten others of similar importance and interest to those in the field.

Applications

RANDOM ACCESS COMPUTER

Charles W. Grady, Midland Mutual Life Insurance Co., Columbus, Ohio
BEST'S LIFE NEWS, September 1961; pages 47, 54-57

Midland Mutual Life uses an IBM RAMAC 305 to process 115,000 policies. Questions asked by policyowners and agents may be answered on a periodic basis or on special request, printed out on paper. Agents are paid every Monday for all business completed through the previous Thursday. The commission statements are written on the machine by Friday night, and a by-product punched card is used to prepare the paychecks. Pre-punched policy status request cards are furnished to agents which may be returned to the home office for computer processing. The resulting policy status report is returned within three days of the query. Tele-processing devices could reduce this time to minutes.

As the computer scans its files during a billing or other operation, it can create a by-product punched card which notifies an agent that a certain policy has not been reviewed with the holder for a year, or that some other item needs attention. The computer will be used for management decision-making in simulation and forecasting. For example, a model agency simulator can calculate the effect of varying elements such as the income and compensation plans for small and large agencies. To take advantage of income tax laws, the computer can simulate the effect of rearranging the company's assets. Also, in portfolio selection, it is possible to determine what ratios of mortgages, stocks, bonds, and other investments will give the highest return consistent with safety.

The company is conducting a long-range study aimed at developing an optimum company-wide management system based on data processing. This project is in three phases: 1) a current description of the company's background, management philosophy, and future aims; 2) system requirements specifications, projected two years into the future; 3) the design of a management system based on the findings of phase 2. The aims of the study include finding new, advanced uses for data processing which will help meet management's goal of increasing insurance in force, by a specified percentage. Some of these areas are: agency manpower requirements ("Factors which will affect agency activity will be put into a mathematical formula to find the total number of agents necessary to produce the desired volume"); asset share calculations; expense predictions; sales forecasting.

PRACTICAL APPLICATION OF E.D.P. EQUIPMENT

Kenneth Baitinger, Rural Insurance Companies
THE INTERPRETER, September 1961; pages 11-13.

The Rural Insurance Companies of Wisconsin use a 305 RAMAC to: 1) rate and write auto policies; 2) change or endorse policies; 3) perform renewal rating; 4) perform premium and loss distribution; 5) perform other miscellaneous jobs such as payroll, furniture and fixture cost analysis, and departmental rental. As an audit trail they transfer the current month's updated file to an unassigned area in the disk file. At the close of each month's operation and after all the file updating is done, they transfer the disks containing statistical records to this unassigned area, and these figures remain there until they are replaced with the next month's records.

HOME OF THE ARMY DOLLAR

BUSINESS AUTOMATION, September 1961; pages 27-31

In 1953 the Army Finance Center began a feasibility study on the consolidation of its allotment operations which were being maintained by separate divisions. Through consolidation the Center saved nearly $1 million a year. In 1958 an IBM 650 was installed, and in April 1961 the Center installed a Minneapolis-Honeywell 800 large scale system. The Civil Service Commission cooperated in continuing employment without grade adjustment until employees were retrained and reassigned, at which time jobs were regraded. Reductions in manpower were made through turnover and attrition.

The system allows the Army controllers to stay within 99.98 percent of the forecasted budget. This is important, since it is a prison offense for an Army controller to go over his budget, and Congress does not provide a cushion fund for a margin of error. The Finance Center serves as a clearing house for all military pay transactions and acts as the home office for more than 400 of the field finance offices. The Center maintains a month-by-month financial history of every soldier's pay during his entire period of service; renders the quarterly employer's report to the Social Security Administration; and reports to the Internal Revenue Service on federal income tax withholdings. In addition, the Center processes transportation charges and freight and passenger service invoices from transportation companies. Monthly payments to all retired Army personnel also come from this Center. Most important job is the maintenance of the Army allotment program, by which soldiers' families, banks, insurance companies and other selected agencies receive regular payments, deducted automatically from the soldier's monthly salary.

New applications are under continuous study. Presently, punched cards and punched paper tapes, produced at local stations, are used at the Center as input. The Center is investigating the use of optical scanning equipment, and of newly developed equipment to convert data from magnetic tape to microfilm at very high speed.

B & M'S HIGH-SPEED "SOLID-STATE" COMPUTER

MODERN RAILROADS, September 1961; pages 129-132

Recently the Boston & Maine Railroad installed a Univac Solid State 90 computing system to process the volume of paper work caused by B&M's position as a terminating carrier. This means that the road receives shipments at a 3 to 1 ratio of its capacity to originate traffic. Much of this paper work, which is far out of proportion to its trackage compared with other Class I railroads, is repetitious, concerned with assessing and collecting freight charges from consignees and then distributing the proper percentages of these charges to the participating roads. Also, the B&M must compute and pay per diem charges for cars moving over its lines on the same 3 to 1 ratio.

Using the new computer, the railroad now completes monthly car records in 12 hours, compared with 72 hours formerly; per diem reports in four hours, compared with 32 hours; a six-month run of eastbound tracing tabulations done in a sixth of the former ten hours. The company obtains the greatest return from its computer by having it perform computations for several programs simultaneously instead of working on one specific function or job at a time. Columnar forms were designed on which information specifically adapted to the road's needs is printed and tabulated. New procedures being explored for computer application are in the field of operating statistics, stores and inventory control, engineering calculations, and compiling of vacation time credits for operating employees.

THE GENERAL LEDGER ON RANDOM ACCESS EQUIPMENT

A. R. Outlaw, Morrison Cafeterias Consolidated, Mobile, Alabama
N.A.A. BULLETIN, September 1961; pages 75-80

Morrison's restaurant chain operates 35 cafeterias, 65 industrial feeding units, 7 service restaurants and 2 warehouses in the southeastern part of the U.S. The 75 corporations making up the company have individual fiscal years.

The company uses an IBM 305 RAMAC to provide daily reports on cash receipts and expenditures, receiving sheets with supporting invoices for credit purchases, and a food cost report. General ledger accounts and balances are stored on magnetic disks.

Each operating unit's ledger requires 230 accounts, with accounts one through 167 containing the balance sheet information and 168 through 230 the profit and loss accounts. Charts of the Daily Transaction Register, Trial Balance, and Profit and Loss Statement are included in the article.

THE USE OF COMPUTERS FOR PSYCHOLOGICAL RESEARCH

BEHAVIORAL SCIENCE, July 1961; pages 252-270

A symposium bearing the above title was held by Division 19 of the American Psychological Association in September 1960. The uses of computers in psychological research into human behavior were discussed in a number of papers. These included a program for simulation of small-group interactions; simulation of the American voting public; the use of a computer to stimulate and interact with human subjects; research on perceptual processes in which a computer generates visual patterns for presentation to human subjects; computer-controlled teaching machines which modify their instruction materials as a result of the student's response behavior.

Programing

A GUIDE TO FORTRAN PROGRAMMING

Daniel D. McCracken
John Wiley & Sons, Inc., New York, 1961

This soft-back book of 88 pages is written "for the person who wants to get a rapid grasp of the use of a computer in the solution of problems in science and engineering." It is suggested the book may be useful as a text for a one-semester hour course in engineering, science, or mathematics, or as a supplement to some other course, or as an enlargement of the descriptions usually given in a FORTRAN programing course. The book may also be used for individual study. Graded exercises and answers to problems are given. Eight case studies show how FORTRAN may be used in a variety of problems. A note marks each point in the text at which enough background has been accumulated to make a case study understandable.

The version of FORTRAN used in this book is that used for the IBM 709 and 7090. Appendix 1 summarizes the characteristics of the other systems. Where the text describes features not found in smaller machine systems, this fact is clearly marked and the reader is advised to skip these sections if he is not concerned with the large machine. The author believes that anyone with a reasonable grasp of elementary mathematics will understand the examples given in the text.

WHAT COBOL ISN'T

Howard Bromberg, Radio Corporation of America
DATAMATION, September 1961; pages 27-29

The prospective user of COBOL must expect to use several manuals to guide him in writing his programs. One of these is "The User's Primer" which is the interpretation of the Department of Defense specifications by the particular implementing manufacturer. It contains the actual rules under which the particular compiler was implemented, and examples demonstrating how the user is to use this set of rules for writing COBOL programs for his particular computer.

The second manual should be the Programming Aids, to supply hints, clues, and directions to the user concerning the use of COBOL elements to establish an effective rapport between the compiler and the computer. The third type of manual should be Compiling Aids, describing the actual operation of the compiler, to help the user to benefit from the various messages, cross reference listings, and correction procedures.

Other major considerations in the use of COBOL should be the expense involved in the use of the COBOL facility, and its place within a total programing systems complex. COBOL is not automatically compatible. The work of modifying a program for a different computer is lessened because COBOL is used as a source language. One approach to complete compatibility would be the creation of a completely machine-independent data description. Each compiling system would have the same description of all data, from which it would be able to create that particular data organization which most effectively uses its computer capabilities for data processing. The programer must take care in writing a program which is to be compiled by and executed on more than one computer, to guard against the use in the "original" program of features which do not appear in the "other" compiler. COBOL is not a complete answer. Rather, it is a device which accepts only part of the programer's responsibility. A compiler needs help in the preparation of proper input data. And COBOL is never a substitute for good systems synthesis or analysis.

COMPUTER SOFTWARE—BOON FOR THE USER

CONTROL ENGINEERING, September 1961; pages 25-30

One computer sales manager believes that the real difference among future computers will be in the "software" offered -- that is, the programing packages which are available to work with general purpose digital computer hardware. Three tables are given in this article which list automatic programing systems available for the principal computers, application programs, and supervisory operating systems.

PROGRAMMER SELECTION SURVEY

John Watson, Bendix Corp., Eclipse-Pioneer Div.
DATA PROCESSING (U.S.), September 1961; pages 9-13

The author conducted a survey among 137 companies to determine some of the variables involved in selecting programers. Some of the findings were:

(1) The most widely used recruitment program (76 companies) was promotion from departments such as accounting, data processing, and systems and procedures.

(2) Thirty companies indicated they recruited from colleges and universities.

(3) Help wanted ads in newspapers were reported by 18 companies.

(4) Some companies recruited through employment agencies, personal contacts, individuals applying for jobs, bidding by employees, or help wanted ads in technical journals.

While more programers are needed as the size of the computer increases, there is no correlation between the number of employees and the number of programers. Nearly as many companies had a minimum educational requirement of high school graduation as companies requiring a minimum of college degree. Most companies use some type of testing technique to help select programers, although this was not the final criterion. Three salary ranges were found to be popular with the $6000 to $8000 being the most popular. Salary increases with the increase in age. There was no indication of fluctuation of salary according to geographical area.

Equipment

THIN MAGNETIC FILM MEMORIES

E. W. Pugh, IBM, Yorktown, New York and W. E. Proebster, IBM, Zurich, Switzerland
DATA PROCESSING (U.S.), September 1961; pages 42-44

Thin film memories have the advantages of high speed operation, low current requirements, small energy dissipation, effective cooling, easy fabrication in entire arrays, high density of memory elements, possible use of printed wiring techniques. The first thin film memory, installed in the M.I.T. Lincoln Laboratory TX-2 computer, has been in operation since July 1959. The first commercial thin film memory is a 128 word, 36 bit per word memory to be delivered with the Sperry Rand 1107 computer.

The thin film memories are faster but have less capacity than ferrite core memories. However, core technology has been under study much longer than film technology. A number of film engineering problems are still to be solved: 1) the difficulty of fabricating large arrays of film with each film meeting the required specifications; 2) the difficulty of detecting the small voltages produced by the reversal of magnetization in the thin films; 3) the difficulty of making transistors and circuits capable of handling the speeds inherently available in the magnetic films.

All memory technology will soon be limited by the finite velocity of electric current propagation which cannot exceed the velocity of light. This is one reason why large capacity memories will always have relatively longer cycle times than can be achieved with smaller memories.

Thin film memories large enough to replace the large and reliable ferrite memories will probably not be available within the next five to ten years. Beyond this time, we may see even more startling developments in technology for computers of the future.

DATA PROCESSING EQUIPMENT ENCYCLOPEDIA

American Data Processing Inc. (formerly Gille Associates)

The Data Processing Equipment Encyclopedia is in two volumes, updated with quarterly supplements and succeeding editions. Volume I includes electromechanical devices. Volume II gives specifications and other information on 86 commercially available general purpose computing systems, seven MICR systems, and five optical scanners, in addition to a number of special-purpose and one-of-a-kind computers. Historical and reference material, bibliographies, glossaries, directory of manufacturers, and pricing charts are included. A typical entry is the IBM 1410, which includes a picture of an installation, a short description of the system, characteristics of the system's components, input-output equipment, auxiliary equipment, programing features, a chart showing cost, power requirements and physical characteristics, and a block diagram of the system. Cost of the two volumes is $50, plus $40 for the updating supplements. Each volume may be purchased separately for $25.

WHAT YOU SHOULD KNOW ABOUT COMPUTER INPUT EQUIPMENT

MODERN OFFICE PROCEDURES, September 1961; pages 34-43

The purpose of input equipment, and the capturing of original data are discussed. Equipment falls into two types: 1) machines that capture data in computer-acceptable form; and 2) machines that feed data directly into the computer. Input equipment may either convert information to computer input media, or capture data as an automatic by-product of another function. Readers include those which read optically and those which read magnetically. Long distance transmission by telephone or telegraph lines may be tied in with a computer system. All of this equipment may be used for tie-in with a service bureau if the company does not own a computer. A chart is given which lists manufacturers and the data input equipment they make with information such as: average monthly lease price, what the equipment does, input media, and operating characteristics.

JAPANESE COMPUTERS

DATA PROCESSING (U.S.), September 1961; pages 17-19

Japan has contributed several unique devices to the computer industry, among which are the parametron -- a memory circuit device -- and the Esaki diode -- a highly insulated germanium diode containing a special negative resistance region. As of last spring, four major Japanese computer manufacturers had installed 53 general purpose computing systems. Much of the input-output equipment used with these computers is manufactured by IBM and Remington Rand Univac. Two railroads have installed seat reservation systems; the telephone and telegraph company is testing an automatic message accounting system; an English-to-Japanese automatic translator is in use. The characteristics of four Japanese computers are listed briefly.

Points of Interest

The Communication and Data Systems Division of Collins Radio Co. has developed a PERT management scheduling and control program for use on IBM 7070 computers and is offering a "Program Packet" free of charge to potential users. Persons interested in obtaining copies of Collins' 7070 and 1401 PERT computer programs may write Mr. Charles K. Titus at Collins' Communication and Data Systems Division, Cedar Rapids, Iowa.

IBM has designed the GPS (general purpose simulation) program which systems analysts at IBM have been using experimentally to analyze and evaluate a variety of system designs, including the SABRE reservations system. Simulation of message transmission between thousands of airline reservation agent terminals and a central computer saved many months in preparing designs of this type of system. GPS is based on the language of block diagrams, familiar to all engineers.

Several articles on Russian use of computers for accounting are available from The Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. These are contained in "USSR Pushes Mechanization of Accounting and Calculating Operations," #61-31565, price 50¢.

"KWIC Index to Neurochemistry" is a 250-page publication prepared by IBM, using a new method of indexing that uses a computer system. The program enables the computer to select significant words from the titles of articles, arrange the words alphabetically, and print them out with several words preceding and following them in the original title.

Krey Packing Company of St. Louis, Missouri, plans to install an NCR 315 computer system for a number of applications: blending formulas for the current day's production, pricing and sales analysis, customer transactions, accounts receivable, payroll, management reports and weekly profit and loss statements.

Barrows & Wallace, residential real estate agents in the Greater Hartford, Conn., area, are using a service bureau for the weekly listing of available homes. The firm uses the system to find those houses which answer the needs of prospective customers. Houses are listed by price, style and house number sequence. The reports give a description of the house characteristics. During the week sales and new listings are noted on a master sheet. On Wednesday the changes are sent to the service bureau and the new reports are returned for the Friday morning sales meeting.

The Institute for New Products, Inc., Ardsley-on-the-Hudson, New York, is a service which can bring together inventors and buyers or licensees through a data processing system which sifts through coded profiles of patents to find those suitable for the prospective investor.

Educational Data Processing Corporation is a service bureau group which assists school districts in attendance records, student scheduling, and census. The group used the first IBM 7090 program for the scheduling of high school students.

Training

Practical Data Processing for Profitable Materials Management

Date: November 15, 1961
Place: San Francisco, California (Mark Hopkins Hotel)

Date: November 17, 1961
Place: Los Angeles, California (Sheraton-West)

Production Profits Through Advance Planning, Analysis and Control

Date: November 14, 1961
Place: San Francisco, California (Mark Hopkins Hotel)

Date: November 16, 1961
Place: Los Angeles, California (Sheraton-West)

Above courses are sponsored by Materials Management Institute, 221 Columbus Avenue, Boston 16, Mass. Cost of each course: $50.

1962 Engineering and Management Course, sponsored by UCLA Engineering Extension

Date: January 22 through February 1, 1962
Place: University of California at Los Angeles
Fee: $450 (includes all class materials, lunch each day and closing dinner)
Information: W. Clare Ennis, Assoc. Coordinator, The Engineering and and Management Course, College of Engineering, Room 6266, University of California, Los Angeles 24, California

Meetings

Annual Convention, American Documentation Institute

Date: November 5-8, 1961
Place: Boston, Mass., M.I.T. and Hotel Somerset
Information: Prof. W. N. Locke, Room 14S-216, Massachusetts Institute of Technology, Cambridge 39, Massachusetts

GUIDE International (IBM large-scale computer users)

Date: November 8-10, 1961
Place: Cincinnati, Ohio (Netherland Hilton Hotel)
Information: E. F. Cooley, The Prudential Insurance Co. of America, Newark, New Jersey

TIMS-ORSA 2nd National Meeting

Date: November 8-11, 1961
Place: San Francisco, California (Jack Tar Hotel)
Information: The Institute of Management Sciences, Box 273, Pleasantville, N.Y.

ACM Technical Symposium sponsored by Los Angeles, Orange County, and San Fernando Valley Chapters of ACM

Date: November 21, 1961
Place: Santa Monica, California (Miramar Hotel)

1961 Eastern Joint Computer Conference

Date: December 12-14, 1961
Place: Washington, D.C. (Sheraton-Park Hotel)
Theme: Computers--Key to Total Systems Control

Forum on Electronic Computers, sponsored by Joint Committee on Continuing Legal Education of the American Law Institute and the American Bar Association

Date: December 14-16, 1961
Place: Los Angeles, California (Statler-Hilton Hotel)
Information: John E. Mulder, Esquire, Director, The Joint Committee, 133 South 36th Street, Philadelphia 4, Pennsylvania

IFIPS Congress 62, sponsored by International Federation of Information Processing Societies

Date: August 27 - September 1, 1962
Place: Munich, Germany

References

DATA PROCESSING DIGEST does not provide copies of the original material digested or reviewed in this issue. The publishers' addresses are listed below for your convenience in writing to them for more complete information.

AID (Auto-Instructional Devices)
P.O. Box 4456
Lubbock, Texas

American Data Processing, Inc.
22nd Floor, Book Tower
Detroit 26, Michigan

Armed Forces Comptroller
516 North Oxford Street
Arlington 3, Virginia

Behavioral Science
Mental Health Research Institute
University of Michigan
Ann Arbor, Michigan

Best's Life News
75 Fulton Street
New York 38, New York

Business Automation
600 West Jackson Blvd.
Chicago 6, Illinois

The Controller
Two Park Avenue
New York 16, New York

Data Processing
22nd Floor, Book Tower
Detroit 26, Michigan

Datamation
10373 West Pico Blvd.
Los Angeles 64, California

Harvard Business Review
Soldiers Field Station
Boston 63, Mass.

Interpreter
I.A.S.A.
P.O. Box 139
Kansas City 41, Missouri

Journal of Industrial Engineering
145 N. High Street
Columbus 15, Ohio

Journal of Machine Accounting
1750 W. Central Road
Mt. Prospect, Illinois

Modern Office Procedures
812 Huron Road
Cleveland 15, Ohio

Modern Railroads
201 North Wells Street
Chicago 6, Illinois

N.A.A. Bulletin
505 Park Avenue
New York 22, New York

United States Investor
286 Congress Street
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